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FRANK HOWITT

It is with great regret that we record the untimely death on May 15, at the age of 59, of Frank Howitt, C.V.O., M.D.(Cantab.), F.R.C.P.

Frank Dutch Howitt was educated at Cambridge and at Guy's Hospital, his medical training being interrupted by the 1914-18 war, in which he served as a combatant officer. On demobilization he resumed his studies, taking the M.B. Cambridge in 1923. After qualification he became attracted to physical medicine, and held the appointment of chief clinical assistant in the actinotherapeutic department at Guy's. Before taking up the important post of physician with charge of physical medicine at the Middlesex Hospital he was assistant physician in charge of physical medicine at the Royal Free Hospital and the Prince of Wales's Hospital, Tottenham. He was also until his death senior physician to the Arthur Stanley Institute for Rheumatic Diseases. He attended King George V during his illness in 1928, in recognition of which he was appointed C.V.O. During the last war he acted as Consultant in Physical Medicine to the Army with the rank of brigadier. When the war was over he was appointed Honorary (Civilian) Consultant in Physical Medicine to the Army; he also became a director of Remploy, Ltd., which is concerned with the employment of disabled persons, and honorary adviser to the Ministry of Labour. Dr. Howitt had been President of the Section of Physical Medicine of the Royal Society of Medicine in 1937-8 and Master of the Society of Apothecaries of London in 1950-1. He served on the executives of the Empire Rheumatism Council and the Royal Institute of Public Health. He held office in the British Association of Physical Medicine, having been elected a Member of Council at the Association's inception in 1944 and serving as Vice-President from 1947 to 1950; he was also a member of the Editorial Board of the *Annals*. Shortly before his death he was made

Obituary: Frank Howitt

an honorary member of the Association. In 1945 he married Violet Norris, daughter of Alfred Leverton, and to her we extend our deepest sympathy.

Dr. William Tegner pays the following personal tribute:

Through the tragic death of Frank Howitt physical medicine has lost a stout champion and a beloved leader. From the moment when he adopted the specialty as his own he decided to devote himself wholeheartedly to it. It was his claim that those who aspired to become physical medicine specialists must prove themselves to be as well qualified, trained, and experienced as those in other specialist branches. He insisted above all that physical medicine specialists should be good doctors and should not confine themselves to narrow fields and specialized techniques.

He had already achieved success and distinction and made a name for himself as a sound clinician and a forceful personality when war broke out in 1939. His appointment as Consultant in Physical Medicine to the Army gave him an opportunity of showing what he expected of the specialty. He chose his team with care and judgment, and expected them to follow him in the display of energy and initiative. He fought the battles of his specialty at headquarters with vigour and enthusiasm, and allowed his team much freedom in the performance of their duties. His efforts were crowned with success, and he played an important part in the organization of the Convalescent Depots and Physical Development Centres throughout the Army. He took a leading part in the new method of assessing fitness by the Pulheems system, and when finally peace came he found himself the acknowledged leader of a team of loyal enthusiasts.

On his return to civilian life he found that his team still regarded him as its leader, and he fought the post-war battles of the specialty with undiminished vigour. He did not hesitate to express his views forcibly and to oppose those who attempted to belittle his specialty or restrict its sphere.

Behind a genial and bluff manner Frank Howitt hid a shrewd and discerning mind. His reputation as a sound and capable physician belied the façade of the simpleton which he sometimes enjoyed assuming. When he felt it necessary he would take infinite pains over small things, and the careless manner with which he would produce the results of burning the midnight oil concealed the care and anxiety which he had expended over his work. He was sometimes tolerant of the second best from those whom he did not consider capable of more, but from himself he would never tolerate anything but his best.

THE SCIENTIFIC APPROACH

DISCUSSION HELD AT THE ANNUAL MEETING OF THE BRITISH
ASSOCIATION OF PHYSICAL MEDICINE ON APRIL 30, 1954

I—A. C. BOYLE

DURING recent years those who practise medicine have shown an increasing unwillingness to accept methods of treatment which, although in use for prolonged periods, have nevertheless rested on no surer foundation than clinical impression. This healthy scepticism has fortunately invaded our own specialty to an increasing degree, and the forceful address given recently by Dr. W. S. Tegner (1954) on the occasion of the Samuel Hyde Memorial Lecture at the Royal Society of Medicine has reinforced this trend. A critical outlook is of particular importance in our own specialty because of the very nature of the diseases with which we deal, and because many of the therapeutic procedures which are used to treat them have yet to be subjected to careful scientific scrutiny. We owe it to ourselves, and to our colleagues in other branches of medicine, to put these procedures to the test, so that time, money, and effort shall not be wasted and in order that our patients shall have the best which we are able to offer. Our specialty is a wide one, and this discussion would be very long indeed if it were to cover all aspects of the problem; therefore, as I am to be followed by those who are more capable than I of instructing you in the scientific method, I hope you will permit me to keep my remarks general and to review briefly some of the more common problems which beset us in our particular sphere of work.

What is Meant by a Scientific Approach

Perhaps we should first get clear in our minds what we mean by a scientific approach. Science is ordered knowledge, and basically consists of two stages. The first stage is the observation of certain facts, from which general laws may be deduced. The second stage is that of inference, and the proof of inference by experiment. Although this stage is fraught with pitfalls, it is quite impossible unless based upon accurate observation. The scientific approach to our work, therefore, should be based upon accurate observations from which certain reasoned inferences may be drawn, and, if necessary, upon experiments suggested by these inferences.

In the introduction to his book *The Scientific Outlook*, written in 1931, Bertrand Russell remarks:

"To say that we live in an age of science is a commonplace, but like most commonplaces it is only partially true. From the point of view of our predeces-

A. C. Boyle

sors, if they could view our society, we should, no doubt, appear to be very scientific, but from the point of view of our successors it is probable that the exact opposite would seem to be the case."

This would be particularly apposite if, in the light of modern methods of controlled clinical trials, we review the evidence presented to us by our predecessors for the supposed effectiveness of certain therapeutic methods. It should also warn us against complacency, and serve as a stimulus to us to improve upon present techniques and to devise new and more accurate ways of assessing and controlling our methods.

Difficulties in Applying the Scientific Approach

As we understand it to-day, science began about three hundred years ago with the work of Galileo, whose first scientific appointment was that of Professor of Mathematics at Pisa. Science was apparently not valued very highly in those days, for his salary was only sevenpence-halfpenny per day. Science advanced rapidly throughout the seventeenth and eighteenth centuries, and during the past twenty years its advance has been spectacular. Remembering how young our specialty is, it is not surprising if in the past we have had difficulty in keeping abreast of scientific trends. An additional burden which we have shouldered during this race of scientific progress has been the legacy of the past. Physical methods of treatment are among the oldest in medicine, and the story of their development, exploitation by cultists, and final acceptance in the field of therapeutics would provide a history in itself. Following the pattern of the introduction of any new method into medicine, their course has been marked by a wave of initial enthusiasm, which has later given place to a more reasonable evaluation of their usefulness. The entry of electricity into the field of therapeutics is a case in point. The recent introduction of ultrasonic therapy also provides an example of the extravagant claims which may originally be made, and found wanting in the light of more sober evaluation. It must be admitted, however, that in some cases the more critical evaluation of these methods has been unwarrantably delayed, allowing many of them to survive by passage from textbook to textbook and impeding the advance of methods of more established value.

At this stage it may be as well to turn and consider how some of these practices of dubious value have survived in these days when science has become a part of almost every man's life. I believe that there are three main reasons: first, even if there has in many cases been little in the way of convincing evidence that certain physical methods of treatment do good, there has been as little or no evidence that they do not do any good, and their survival has therefore rested on a negative rather than a positive basis; secondly, there have always been a public demand for, and a belief in, unorthodox methods in the cure of disease; and, thirdly, the nature of

The Scientific Approach

the group of diseases for which it is customary to use physical methods of treatment and which form the bulk of our clinical practice. Those painful disorders of locomotion, rheumatic diseases, or call them what you will, are diseases which are in the main self-limiting, and will often get better in spite of treatment. Other diseases in this group have a natural history of remissions and exacerbations which makes the assessment of any therapeutic procedure a matter of considerable difficulty. In addition, many of these diseases are manifested by pain and pain alone, so that any objective assessment of improvement is also a matter of extreme difficulty, if not impossibility. It is a matter for regret that the patient is no longer allowed by the statisticians to be an arbiter of the progress of his disease, for subjective improvement must always be the ultimate goal of any therapeutic measure.

Examples illustrating the Difficulties

1. RHEUMATOID ARTHRITIS

If one were to search for a disease which well illustrates all these difficulties, one's choice would probably fall upon rheumatoid arthritis; and as this disease is a problem common to us all, perhaps I may be forgiven for using it as an example. If we study the natural history of untreated rheumatoid arthritis we find that in approximately one-quarter of those affected the disease will become permanently quiescent after a brief acute episode and may be counted as clinically cured; one-half will continue to have remissions and exacerbations, though in general showing a slow deterioration over the years; and one-quarter will run a relentless downhill course, often to become permanent bed-bound cripples. In the first group whatever form of therapy is employed will get credit for the final good result. In the second group, those with remissions and exacerbations, it should be remembered that the patient is often driven to attend medical consultation when his latest exacerbation is at its peak, with every prospect of a remission in the not too distant future, so that once again any therapeutic procedure bears a fair chance of success. In the third group any degree of improvement obtained will justify whatever form of therapy has been employed.

In addition to the natural course of the disease there are further difficulties which have already been mentioned. The first is the difficulty of objective assessment of progress. With the possible exception of the erythrocyte sedimentation rate—and even this is not always completely reliable—there are no laboratory tests which will help us. Tests of function, as have been shown by Quin and his colleagues (1950), may show response which varies from day to day or even from hour to hour, and with encouragement and injections of distilled water a patient may be able to perform tasks which both he and his doctor had previously considered to

A. C. Boyle

be impossible. Even the advent of cortisone and ACTH, with the widespread bodily changes which these drugs bring about, has not made the situation any easier, for the estimations which are often carried out during the treatment with these drugs, such as the eosinophil count, urinary ketogenic steroid output, or plasma steroid level, are not tests of rheumatoid activity but of adrenal function.

Lastly there is the apparent inherent suggestibility of patients suffering from this disease, which must be carefully included in assessing the results of any form of therapy. It must be a common experience among physicians who deal with rheumatoid arthritis to find there are many patients who can be kept mobile merely by regular medical consultation. They are offered no treatment other than encouragement. If, however, they are denied their regular consultation they rapidly become chair- or bed-fast cripples. This suggestibility is naturally most marked where new and much-advertised therapeutic procedures are used. We have recently been carrying out clinical trials of a long-acting preparation of ACTH. One of our patients with active and progressive rheumatoid arthritis appeared to derive much benefit from this form of treatment. After a few weeks, however, she developed glycosuria, so that the drug had to be withdrawn. She complained bitterly that all her symptoms had returned in full force, and after an interval of a few days she was restarted on an inactive preparation containing kaolin in distilled water. Her subsequent improvement was as dramatic and gratifying as when she had had the active preparation, and this response has been maintained to date for over two months. Her progress, however, was interrupted by an interesting episode a few weeks ago, when the doctor who was giving her the injections, and who was also unaware that the preparation was not ACTH, accidentally injected an enormous overdose. He immediately told the patient of this mistake and advised her to attend our clinic. When seen she was in a state of collapse and complained of severe headache, vertigo, and palpitations, but on being reassured that these symptoms would subside she made a dramatic recovery. These placebo effects are not uncommon, and have been noted in other clinical trials in which inert substances have been used.

These, then, are some of the difficulties in treating, and in particular of assessing the results of treatment in, this disease. Much can be done for those who suffer from it, but we should not be too hasty in ascribing benefit to any measure which may have been employed. There are other diseases in the group of locomotor disorders, such as tennis elbow or frozen shoulder, in which it is possible that the symptomatology and natural history are completely unaltered by any of the methods of treatment commonly employed in the past. The local injection of hydrocortisone, however, seems to offer hope of cutting short these painful conditions, and will perhaps also dispense with the prolonged and valueless treatment employed hitherto.

The Scientific Approach

2. BREATHING EXERCISES

My second example is more directly concerned with the therapeutic and prophylactic sphere of our work, and illustrates the caution with which we should view established beliefs. It has been an almost universal practice for many years to give pre- and post-operative breathing exercises to those undergoing surgical operation, and this practice is still a routine in many hospitals. Preoperative breathing exercises are given to gain the patient's confidence and to teach what will be expected of him immediately following operation. These exercises are continued postoperatively with the object of preventing pulmonary complications and, in particular, postoperative pulmonary atelectasis and infection.

There are many factors which may play a part in the incidence of postoperative pulmonary collapse, among the most prominent of which are: the anaesthetic; the operation site; the age and general health of the patient, particularly his liability to respiratory infection; his habits as regards alcohol and tobacco; and the presence or absence of obesity. In view of the many and diverse factors which may be involved, any assessment of the effectiveness of pre- and post-operative breathing exercises requires the most careful scrutiny.

In 1952 a carefully planned trial was carried out by Palmer and Sellick, and as a result it was clearly shown that the normal routine of breathing exercises before and after surgical operation had no effect whatsoever in preventing postoperative pulmonary complications. Indeed, in this trial the incidence of this complication was higher in the treated than in the untreated cases, although the difference was not great enough to be significant. Palmer and Sellick carried their investigation further, on the inference that pulmonary atelectasis following operation was the result of increased bronchial secretion followed by stagnation and blockage of dependent bronchioles. With this possible mechanism in mind, they treated a third group of patients postoperatively by postural drainage preceded by the inhalation of a bronchodilating drug, and in this group they were able to record a significantly lower incidence of pulmonary complications.

This is an example of the wasted effort which may follow belief in an established practice and in which benefit can be given to the patient following a more scientific approach. A further example in this field—the effects of ante- and post-natal exercises—might well be investigated, for it is doubtful if their use materially alters the length or quality of labour or the puerperium.

The Risk of being "Blinded by Science"

These, then, are some of the difficulties which beset us in our endeavours, and which, if we are to maintain the increasing stature and

A. C. Boyle

importance of our specialty, we must overcome. But there is a further difficulty which this very approach may raise, and that, if I may borrow a much-hackneyed phrase, is that we may be blinded by science, for one can be a good scientist without being a good doctor, but one cannot be a good doctor unless one is also scientific. Transcending science, however, the good doctor develops a higher reason which is wisdom, and armed with this he should not necessarily deny treatment to certain patients because his scientific training tells him that it will do no good. I believe that there are many patients to whom the administration of a placebo may be good doctoring, provided we are careful that we do not deceive ourselves as to the true purpose of such treatment and the method by which it may bring about a good result. In the words of Sir Francis Walshe (1950):

"In the application of science to the practice of medicine the physician needs practical as well as speculative wisdom. He must be governed in his actions by a wise regard for the whole welfare of each patient individually. This regard is the peculiar, the essential act of virtue called prudence, which transcends natural science and comes within the category of moral excellence—ethics."

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II—A. T. RICHARDSON

THE term "science" has tended to become restricted in modern usage to those studies called natural sciences—for example, physics and chemistry—and also in recent years to that form of applied knowledge called technology—for example, electronics. Such a narrow concept is unfortunate, for it implies that science is distinct from human or social studies. Thus, in physical medicine it has suggested to some that there exists, or should exist, a difference in training and outlook between those whose work consists largely of the accurate and effective application of physical agents in diagnosis and treatment and those whose practice is devoted more to the clinical and social care of sufferers from the locomotor or rheumatic disorders. In this paper I hope to show that the scientific approach—that is, one based on a scientific training and the application of the scientific method—not only is compatible with both the clinical and technical aspects of the specialty, but is indeed the essential basis for its present practice and future development.

The Scientific Approach

The Scientific Method Defined

The scientific method in its widest sense may be taken to mean the study of any determinate subject-matter by means of an appropriate technique. When such a study is systematic and precise, and particularly when its carrying out is combined with understanding of it, the full scientific method is achieved. Thus the scientific method can be applied equally to the study of the effects of metal on a short-wave diathermy field as to the study of phenylbutazone treatment in rheumatoid arthritis.

In medicine as in other observational sciences the scientific method generally takes a well-defined form, in which adequate experience is subjected to statistical proof, or is used to derive a hypothesis which is extended and from which it is deduced that under certain conditions certain events will take place. The occurrence of the deduced events under the specified conditions goes a long way towards proving or disproving the hypothesis. Ultimately the results of any form of the experiential-experimental method must be expressed in statistical terms. It is only on this basis that they can be applied exactly to practical medicine, and in the case of therapeutic investigations an answer given to the questions: "Is this treatment of value? Of how great a value? And with what types of patient?"

Although it is convenient to consider contributions to physical medicine based on experience separately from those based on experiment, it is from the combination of the two that advances come. Indeed, the situation is common in medicine where one investigator has been responsible for a primary and fundamental hypothesis, albeit an empirical discovery, and another for giving it quantitative and scientific aim. The collaboration of von Behring and Ehrlich on antitoxins is an example of this. Few will deny that in physical medicine there is an immense accumulated experience waiting to be converted into statistical terms or subjected to experimental proof—in short, waiting for the scientific approach.

Scientific Contribution based on Experience

"General experience is fallible." How much ineffectual physiotherapy has been applied because of a failure to realize this fact? So many of the forms of treatment remaining in widespread use in physiotherapy departments fall into the category of those whose effectiveness has never been scientifically established. For example, it is stated in many textbooks that ultrasonic treatment hastens the resolution of fibrous tissue; indeed, it is commonly used for that purpose. In fact neither this nor any other effect of value in clinical work has been proved. Doubtless if more of the diseases we treat had a fatal outcome the limitations of many currently popular treatments would have been realized by now. It seems that in the presence of diseases whose effect is mainly to produce symptoms, not objective signs,

A. T. Richardson

and whose natural history is towards remission—for example, tennis elbow and capsulitis of the shoulder—or whose progress is from remissions to relapses—for example, rheumatoid arthritis—the use of ineffectual treatments readily grows. This is because they do no harm; remissions occur unhindered, and if the ineffectual treatment is in use at the time of remission another therapeutic success is acclaimed.

It may be suggested that no treatment can be called ineffectual if it impresses the patient that something is being done, and thus relieves anxiety. However, to restrict physical medicine to this sort of objective would be to deny the place of specific treatments, such as resistance exercises for restoring muscle bulk and manipulation for restoring joint range. It would also invite such comments as that of Professor Pickering in his Presidential Address to the Section of Experimental Medicine and Therapeutics of the Royal Society of Medicine in 1948. Referring to physiotherapy he said:

“Many patients enjoy and value the treatment they receive, but I am quite uncertain whether the value comes from the specific measures employed or from the uplift that their souls receive at the hands of the capable, enthusiastic, and attractive female staff, and at the sight of such wonderfully complicated and colourful apparatus, suggesting that here indeed is medical science at its fullest bloom.”

There is clearly a necessity not only for the introduction of statistical studies of many physical treatments, but also for studies of the natural histories of the various conditions to which they are applied. However, although it may be anticipated that advances will occur when the science of statistics is applied to physical medicine, the method is not without its difficulties. These derive from the general fact that when biological material is studied the use of controls is essential. In studies on human patients, where the variables are numerous, a large number of controls is often necessary, and these may not always be available in a single department. Further, there are ethical problems which some may find difficulty in surmounting. These arise from the usual practice of obtaining controls in a therapeutic investigation by withholding the treatment from one group of patients. It is only rarely, such as in some forms of malignant disease, that the success of any new treatment can be established, because it can be judged against a background of 100% fatality. Certainly this does not occur in the chronic locomotor diseases. However, in these diseases, except in rare instances, depriving patients of physical therapy will not endanger life and limb even if it prolongs symptoms, and this may well be justified if it leads to obtaining the greatest good for the greatest number. In any case, it is often possible to control therapeutic investigations of physical agents by means of patients treated by a different form of therapy.

It will be generally accepted that statistical control in any new therapy

The Scientific Approach

should be resorted to early, and certainly before any hints of the effectiveness of the therapy become well known and popularized. Unfortunately, in physical medicine an abundance of treatments have already been introduced without statistical justification. I do not believe that these should be rejected now until they can be reintroduced in a scientific manner, for such a policy may lead to therapeutic nihilism; indeed, this attitude has already begun to show itself in physical medicine. A better policy is to institute investigations into these methods as soon as possible, and in the meantime to resist deluding ourselves that they have established efficacy. We must also ensure that when the scientific value, if any, of these treatments becomes established the fact is made widely known. For instance, anodal galvanism in the treatment of knee effusions has been investigated scientifically and found wanting, but it continues to be used on a grand scale.

The Experimental Method

The advantage of the experimental method is that it often hastens the establishment of scientific truth as compared with prolonged statistical studies. Since the establishment of the experimental method in physics in the late sixteenth century, and its spread to medicine, notably with Harvey's triumphant discovery of the circulation of the blood, more and more facilities for experimental work have been established. To-day we see increasing co-operation between clinical research workers and the experimental natural scientists. We also see the establishment of many postgraduate institutes where facilities for experimental work are available. In physical medicine we still lack either a postgraduate institute or a professorial unit in which experimental work can be centred. In spite of this a considerable amount of investigation into the effect of physical methods of treatment has taken place. This has been made possible, first, by the establishment within physical medicine departments of laboratory and workshop space where the physical medicine specialist can carry out his experiments. This follows closely the American pattern. As a result we have seen, in particular, accurate investigation into the distribution of short-wave fields in phantoms and the value of self-tuning short-wave diathermy, and also the effects of physical agents on blood flow as judged by plethysmographic measurements. These important contributions are now finding their applications in practice. Secondly, physical medicine departments have established close liaison with a physics department, wherein facilities for experimentation are made available. From this co-operative effort many of the laws governing microwave heating have emerged and the effect of physical agents on blood flow as judged by radioactive sodium clearance has been determined. I hope that these few examples will scotch the criticism that we are unwilling to adopt the

A. T. Richardson

experimental method in physical medicine. In this connexion may I again quote Professor Pickering:

"Physiotherapy is a therapeutic department that occupies more and more space in our hospitals: employs more and more people and costs more and more money. As a form of therapeutics it is of course well adapted for the use of the experimental method, but so far as I am aware this has not yet been applied. One is tempted to wonder whether physiotherapists are afraid that enquiry would show their methods to have a very restricted sphere of usefulness or whether it is because the scientific method has not yet penetrated to this speciality."

We must accept the fact, however, that much more experimental work into the effects of physical agents is required, and I believe this Association will soon have to give consideration to the establishment of an institute for postgraduate training and research into physical medicine.

Although I have emphasized the application of experimental technique in the investigation of the effects of physical agents, the same approach, whether by the use of physical or biochemical measurements, is being used increasingly in the locomotor diseases. As an example of physical measurements applied to these diseases, recent publications on the measurement of the viscosity of synovial fluids may be quoted; and as an example of biochemical measurements, the abundance of papers on adrenal steroid changes with cortisone therapy.

It is perhaps the adoption of the narrow view that I have referred to earlier that has led to the comment that the Diploma in Physical Medicine, with its emphasis on physics and its preoccupation with such topics as amplifier errors and the applications of transducers, is suitable only for those desiring a training in the experimental techniques applicable to the investigation of physical agents. Surely this is contradicted by the lessons we learnt from the last war. It was found then that a good training in one particular scientific subject which induced a critical attitude and familiarity with the scientific discipline produced a scientific mind which could be applied to any subject, even armaments.

Scientific Reasoning or Logic

There remains a further step following the establishment of scientific facts by statistical or experimental methods to which I must make a passing reference. This is the process of scientific reasoning or logic. We still read of conclusions based on both scientific and unscientific investigations which have no validity. Doubtless the elimination of this will come with further understanding and wider application of the scientific method. May I give one illustration of this? You will recall what for most of us was our first lesson in logic. It went something like this: All men have beards; A is a

The Scientific Approach

man, therefore A has a beard. All men have beards; A has a beard, therefore A is a man. The second syllogism is incorrect as it contains an undistributed middle. Yet we have had several recent contributions in which something like the following occurs: Prolapsed intervertebral disks are cured by manipulation; A has been cured by manipulation, therefore A has a prolapsed intervertebral disk. And it has even been suggested that if A wasn't cured by manipulation then A did not have a prolapsed disk—or at least had some peculiar form of prolapse. The derivation of diagnoses or pathology from therapeutic successes remains all too common. I think one reason for this has been the swing of the pendulum away from the treatment of symptoms towards the treatment of pathology by specific methods, with the resultant desire to label every patient with an exact diagnosis and implied pathology.

Conclusion

I hope that I have shown that the scientific approach is basic to all forms of physical medicine practice. I hasten to add, however, that physical medicine can employ the scientific approach only as a foundation upon which to build, for, like medicine itself, it is a philosophy. Thus, whereas science has really no clear-cut end beyond the establishment of truth, physical medicine has the clear aim of establishing and maintaining the physical health of the individual and of society. In this work the part to be played by tradition, clinical instinct and, above all, personal relationship is undeniable.

III—RICHARD DOLL

"GENERAL impressions", said Francis Galton, "are never to be trusted. Unfortunately when they are of long standing they become fixed rules of life and assume a prescriptive right not to be questioned. Consequently those who are not accustomed to original inquiry entertain a hatred and a horror of statistics. They cannot endure the idea of submitting their sacred impressions to cold-blooded verification."

When Galton wrote these words the methods of science were less generally accepted than they are to-day, but nevertheless I think that the precepts he was propounding can from time to time be recalled with advantage and our daily practice measured against them. These precepts I take to be two: namely, that we should regard accustomed beliefs with scepticism, and that we should develop fresh beliefs only on the basis of observation and experiment. Galton himself followed these precepts to the utmost limit; so much so that at one time he tried to determine the efficacy of prayer by inviting a group of people to pray for the recovery of

Richard Doll

patients in one wing of a hospital, while the other wing, which over a long period had been found to have a similar death rate, was, in modern parlance, kept as a control.

The Need for an Attitude of Scepticism

An attitude of scepticism is as necessary in Medicine to-day as ever. It is easy enough to be sceptical about new theories or the results of other people's experiments, but it is not so easy to be sceptical about the beliefs we were brought up in or the practices we have long adopted. I hope you will forgive me if I take an example from the field of general medicine, but recent observations on the treatment of peptic ulcer illustrate particularly clearly the enduring need for scepticism. For as long as records exist patients with peptic ulcers have been treated by special diets, and hundreds of thousands of persons annually have been made miserable by attempting to follow strictly the doctor's orders not to eat red meat or green vegetables or fresh fruit, nor any of the delicacies which make life enjoyable. Yet there is no evidence which bears examination in favour of these prohibitions. In fact, when the effects of diets are tried out in a planned fashion it is found that, under hospital conditions, there is no difference in the duration of the pain or in the rate of healing of the ulcer as between patients given the standard ulcer regimen and those given the ordinary hospital diet.

It is, however, not only traditional practices and those which are based on "general impressions" which demand a sceptical approach, but also—and perhaps pre-eminently—all those practices which are adopted for theoretical reasons. The use, for example, of ultraviolet light in offices to reduce the incidence of colds because ultraviolet light can destroy viruses; or the application of radiant heat because it increases the blood supply and because an increased blood supply facilitates the removal of local toxins or waste products, which are believed to be a cause of disease. Such theoretical reasons can never justify the general adoption of a form of treatment—though they may well suggest that its use should be investigated. The only justification for any form of treatment is that, in practice, it works. That is not to say that I am advocating a pure empiricism. The clarifying effect of new theories has been responsible for some of the greatest advances in medicine. But theory and practice must go hand in hand, for theory alone unchecked by planned investigation is still to-day responsible for much unnecessary and even harmful treatment, as it was in the days of routine phlebotomy.

The Application of Planned Experiments

In the field of medicine the application of planned experiments is more complex than in some other sciences. There is, first, the overriding consideration of the ethics of human experimentation; secondly, the variability

The Scientific Approach

of human response; and, thirdly, the difficulty of excluding bias from the subjective reaction of both the patient and the observer.

The variability of response is a complication which medicine has in common with all biological sciences. It is overcome in three ways: by repeating the experiment on the same patient or on a number of patients; by observing at the same time the reaction of a control series of patients treated identically save for omission of the specific treatment under investigation; and by allowing statistically for the possible effect of uncontrolled chance factors in bringing about the observed result. It is not always necessary to have large numbers for a satisfactory experiment. With a well-planned investigation the results of which are clear-cut it is possible to be reasonably certain of them after as few as ten or a dozen observations; in exceptional cases even less. If it is possible to repeat the experiment in the same individual, conclusive results may sometimes be obtained from two or three patients. Unfortunately, however, our results are seldom so distinctive, and in these circumstances it may be necessary to repeat the experiment on 50, 100, or even more occasions. Observation of a concurrent control series is nearly always essential. In rare instances, as, for example, when streptomycin was introduced for the treatment of tuberculous meningitis, a concurrent control series could be dispensed with, since the disease was known to have been uniformly fatal and a single recovery was adequate to show that the treatment had value. Such conditions are, however, uncommon, and in general it is a wise rule not to rely on comparison with past experience, since there is no knowing what changes may have taken place in the type of patient presenting or in the methods of assessing recovery.

The degree to which results can be biased by the subjective attitude of the patient or of the observer has only recently been fully appreciated. To some extent it can be eliminated by using objective criteria, such as the survival of the patient or the erythrocyte sedimentation rate, for assessing the effects of therapy. But this is not always possible—it may be, for example, that what we are trying to do is to relieve pain. Moreover, this safeguard does not avoid the bias which may be introduced by the doctor's selection (albeit unconscious) of patients with a more favourable prognosis for one or other group. Experience has shown that such forms of bias are most readily avoided if patients are selected for either the experimental or the control group by some random method—by, say, allocation of alternate patients to each group, or, better still, by following instructions which have been prepared previously and placed in a sealed envelope not to be opened until it is decided to include the patient in the given investigation. If now the control group of patients can be given treatment which is apparently identical with that given to the trial group by, say, connexion to the same instrument but with the current short-circuited, and if, further, it is possible to arrange that the doctor who is assessing the result does not know which

Richard Doll

treatment the patient has had, we have experimental conditions which are the most likely to provide us with incontrovertible results.

An Illustrative Investigation

An investigation recently carried out to determine the value of an embrocation in reducing pain and stiffness in an arthritic joint illustrates the principles referred to above. Three apparently indistinguishable embrocations were tested: the embrocation which was the special subject of the trial, a standard embrocation regularly used in the department, and a supposedly inert excipient. The embrocations were labelled X, Y, and Z, and the doctors who were to assess the results did not know which was which. Each patient attended on three consecutive days, when one or other embrocation was applied. Each received an application of each embrocation once, but the order in which the embrocations were applied varied from patient to patient and was determined previously in such a way that every order—X, Y, Z; X, Z, Y; Y, Z, X, etc.—was used equally often. The results were recorded by two methods. First, the doctor who had applied the embrocation recorded the patient's own impression as to whether there had been no, slight, or marked improvement in the amount of pain on movement at both one and three hours after the application. Secondly, the other doctor, who did not know what the patient's own account was and who did not even know the code letter given to the embrocation, assessed whether there had been no, slight, or marked improvement in movement, swelling, and tenderness. Since the doctor did not know the code letter there could be no danger of his forming an early opinion that one embrocation was of greater or less value than the others and so prejudicing his later judgment.

The results were as follows. The proportions of patients who considered there had been some improvement after one hour were 48% when embrocation X had been used, 55% when Y had been used, and 48% when Z had been used—that is, there was apparently a slight advantage to embrocation Y. At the end of three hours the advantage had disappeared and the percentages were 57%, 61%, and 61%, respectively. The doctor's assessment was surprisingly similar. Some improvement in movement was noted in 47%, 58%, and 50% of the patients after the use of the three embrocations respectively; 8%, 17%, and 6% showed reduction in swelling and 12%, 19%, and 17% a decreased tenderness.

By each method of assessment there was, therefore, a suggestion of greater benefit one hour after the application of Y (which was in fact the new embrocation under trial), but there did not appear to be any difference in the effect of X (the embrocation used routinely in the past) and Z (an inert excipient). Whether or not these results can reasonably be attributed to chance factors cannot, of course, be determined from the simple per-

The Scientific Approach

centages. To do this it is necessary to know the absolute numbers involved. In this experiment the numbers of patients were small and the differences found were well within the limits of chance variation. It is, therefore, not possible to dogmatize about the result. The fact, however, that both methods of assessment pointed in the same direction would suggest that the differences may be real and would justify extending the investigation further.

Ethical Aspect

I have so far made no reference to what I described as the first factor to complicate investigation in man—namely, the need to consider its ethical implications. Nor would it be appropriate for me to try to discuss these in detail. But there are two points which, in conclusion, I should like to make, since they are particularly relevant to a discussion on “the scientific attitude” in medicine. The first relates to the object of science, which, as I see it, is to gain power to control nature in the interests of humanity. This last qualifying phrase is, I believe, an essential characteristic, and its effect is to include within the confines of the scientific attitude the requirement that doctors should pay constant and full attention to the personal interests of each individual who comes under their care. My second point is a corollary of the first—namely, that when we ask ourselves the question, “Is it ethical to carry out this investigation?” we should also ask, “Is it ethical *not* to?” For by not carrying out the investigation we may be condemning the patient to wasted hours of attending hospital for therapy which does him no good, may cause loss of work and consequent impoverishment, and may even be medically directly harmful.

PAIN IN THE NECK*

BASED ON A STUDY OF 100 CASES

By MAURICE HART

From the Department of Physical Medicine, Middlesex Hospital

PAIN in the neck is a very common ailment and many patients with this symptom can be found among those attending physiotherapy departments. The treatment of this condition by physical means has a time-honoured place in therapeutics, yet chronic neck pain is notoriously resistant to such measures.

We are always meeting with the patient who has suffered from neck ache, pain, or stiffness for as long as she can remember—it is usually a woman—and she lists the remedies that have been employed: radiant heat, massage, exercises, diathermy, traction, manipulations, and so on. One patient that particularly interested us at the Middlesex Hospital was a middle-aged civil servant who had attended a physiotherapy department for one hundred treatment sessions spread over a year, and still his pain remained entirely unchanged. Observing these facts, Dr. George Blair and I decided to make a close study of any such patients who came our way.

History-taking

The keystone of this inquiry into the problem was the elicitation of a full history in the best Hutchinson and Hunter tradition. Obtaining a complete anamnesis is time-consuming, but it is time well spent, since besides being essential for diagnosis it may have a marked therapeutic value. The history therefore embodied sufficient detail concerning the social, personal, and family background of the patient for us to evaluate the type of personality with which we were dealing.

We then traced the previous medical history of the patient until the onset of the complaint under consideration—namely, pain in the neck. Following the pattern of systematic inquiry regarding pain at any site, we noted its duration and mode of onset, its description, its intensity, its constancy or otherwise, its relation to movements of the head, factors provoking or aggravating pain and factors relieving it, the distribution of any referred pain, and the occurrence of night pain. Lastly we inquired into the general state of health. We then endeavoured to assess the severity and importance of the complaint by considering its effect on work or the normal occupation of the patient.

* Based on a paper read on May 1, 1954, at the Annual Meeting of the British Association of Physical Medicine.

Pain in the Neck

Method of Examination

A routine general examination of all systems was carried out, followed by a more detailed local examination of the head, neck, shoulders, and upper limbs. Using a goniometer, neck movements were measured in both the sitting and lying positions. Pain during or at extremes of movement was noted and whether it was located on the homolateral or contralateral side. The distribution of referred pain was recorded.

It will be observed that no mention has been made of palpation to detect areas of tenderness. This is because we have come to regard such a finding as a snare and a delusion. When tenderness is present it has probably been produced initially by the probing fingers of the patient compressing soft tissues against underlying bone; its significance may have been magnified by the doctor, and it may have been further aggravated by local deep massage by an enthusiastic physiotherapist.

Routine radiological examination was carried out in all cases; but, as will be seen, this has only slight positive value in diagnosis and serves mainly to exclude unforeseen bone or joint disease.

More than a hundred cases have now been studied along these lines.

Diagnosis in Cases Studied

TABLE I
DIAGNOSIS IN 100 CASES OF NECK PAIN

Diagnosis	Males	Females	Total
Organic	12	17	29
Mixed pathology	3	19	22
Functional	8	41	49
Total	23	77	100

Table I shows the diagnosis established in the first 100 cases. These can be classified into three groups. The first group consists of patients suffering from an unequivocal organic condition; the second, those in which organic disease and psychopathology were blended; and the third, those whose symptoms were wholly functional.

The first group consisted of 29 patients. Thus less than one-third of the patients in this series had solely organic disease to account for their symptoms, the condition diagnosed being either degenerative joint disease or a disk lesion. A notable feature of this group was the comparatively short history frequently elicited—that is, short when compared with that in the functional conditions. For example, a man of 78 years with well-marked degenerative changes at the cervical articulations admitted to symptoms for only one year. This is to be expected in a condition the

Maurice Hart

symptoms of which frequently undergo natural remissions; cervical disk lesions also often run a self-limiting course.

In the *second group*, consisting of 22 patients suffering from organic disease and some form of functional disturbance, there was a marked predominance of women. Analysis of the history and careful assessment of the local physical signs revealed some organic condition—either mild degenerative joint disease or a cervical disk lesion—but the disability due to this should not in itself have caused incapacity. Broadly speaking, there were three major reasons why it did. First, the presence of a superstructure of chronic anxiety around a physical condition, or in some cases even a florid chronic anxiety state. In the majority of cases the patients had previously been informed that spinal arthritis was present, and this was considered to be an important aetiological factor in the determination of reactive anxiety. This was the entire explanation for prolonged incapacity in the case of the three men in the group. Secondly, women are particularly prone to cancerphobia, and the symptoms of many a mild organic disturbance may be perseverated in a woman because she is certain that there is a malignant basis for her complaints. Thirdly, where menopausal symptoms are concurrent with local organic disease it is the former which may be of major significance in the determination of disability. Yet these symptoms are not always mentioned spontaneously by the patient and must be inquired for during systematic history-taking.

The *third group* consisted of 49 patients who were considered to be suffering from a wholly functional condition; these cases are analysed in Table II. In 33 instances—6 men and 27 women—the complaint was

TABLE II
FUNCTIONAL NECK PAIN

Diagnosis	Males	Females	Total
Psychosomatic	6	27	33
Depression	—	3	3
Hysteria	2	—	2
Menopausal	—	11	11
Total	8	41	49

regarded as a psychosomatic disorder related to stress in various forms, such as headache. Typical in these cases was the long history running into years or even decades, and the finding of a full range of neck movements with the complaint of pain, described as a feeling of being stretched, on the contralateral side. These patients have become excessively conscious of the normal discomfort produced at the extremes of neck movements, and interpret this discomfort as pain. This morbid awareness of a physiological state is a well-recognized occurrence in other organ neuroses. Three

Pain in the Neck

women, by psychiatric evaluation, were found to be suffering from depression. Two men were suffering from conversion hysteria. One of them—aged 34—was compelled to lie down frequently during working hours. The importance of the climacteric is exemplified by the 11 women whose symptoms dated from the onset of the menopause; neck pain was associated with other menopausal symptoms such as headaches, flushings, sweatings, giddiness, and sometimes arthralgia.

Role of Radiography in Diagnosis

The radiological findings in the 100 cases, analysed according to the clinical diagnoses, are given in Table III. From this it can be seen that a diagnosis embodying an organic factor was arrived at in eight instances, despite a normal radiograph. However, more usually when degenerative joint disease has been diagnosed on clinical grounds radiological changes will be demonstrable provided the articulations can be clearly visualized. In one case, for example, degenerative joint disease was diagnosed clinically despite a normal X-ray film.

TABLE III
RADIOLOGICAL FINDINGS

X-ray Findings	Clinical Diagnosis			Total
	Organic Disease	Organic Lesion as a Factor	Functional Disorder	
Normal	3	5	18	26
Osteoarthritis	11	2	—	13
Disk lesion—C 4/5 ..	—	1	2	3
" " C 5/6 ..	6	3	10	19
" " C 6/7 ..	3	—	6	9
Multiple pathology ..	6	11	13	30
Total	29	22	49	100

When a cervical disk lesion has been diagnosed by clinical methods radiological examination will contribute nothing further by way of confirmation. Thus disk-space narrowing with osteophytosis was seen radiologically in 30 patients considered clinically to be suffering from an organic lesion, and also in 31 patients suffering from functional disorder.

Observations on Treatment and Disposal

No claims are made for any particular line of treatment of pain in the neck, but some general observations on the management of the cases coming under our care may be useful.

The symptoms of degenerative joint disease can be much ameliorated by short-wave therapy. However, active neck exercises in this condition

Maurice Hart

tend to aggravate symptoms and persevere disability. The patient must be prepared to accept some limitation of neck mobility rather than attempt to use the full range and thereby increase the pain.

Cervical disk lesions usually settle very well with conservative care: relieving pain by full dosage of a simple analgesic and ensuring sleep by adequate sedation. The painful stiff shoulder that may occur secondarily to cervical disk lesion may be treated by radiant heat and gentle active exercises.

Patients suffering from psychogenic neck pain were treated by the "prolonged interview" technique of psychotherapy at monthly intervals, and usually this resulted in considerable improvement after three months. However, where a psychoneurosis was of long standing and firmly established it was found to be comparable to a paranoid state in its resistance to psychotherapy.

As an adjuvant to psychotherapy placebo tablets of compressed lactose were used in 17 instances, and it may be of interest to mention that, although 14 patients admitted to considerable benefit from the tablets, the other 3 had symptoms of intolerance, such as gastric upset, hyper-somnia, and palpitations.

Patients in whom the climacteric played an aetiological role in the clinical picture were given tablets containing ethinyloestradiol, 0.01 mg., and methyltestosterone, 3 mg. On a dosage of one tablet twice a day improvement was always most gratifying.

Patients with depression were kept under observation, and in one instance a worsening of the condition necessitated specialized psychiatric out-patient care. Dramatic improvement followed a short course of electric convulsion therapy in this case.

One patient with hysteria—the 34-year-old man previously referred to—became so disabled that admission to hospital as a voluntary patient was advised.

Summary and Conclusions

The findings in this study of 100 patients suffering from pain in the neck can be summarized as follows :

- (1) Accurate and complete diagnosis can be established only by study of the patient as a whole.
- (2) Long-standing and intractable neck pain is more likely to be due to psychopathology than to an organic lesion.
- (3) Clinical evaluation carries more weight in diagnosis than radiological examination.
- (4) Prognosis is poor in cases of long-standing organ neurosis.

Acknowledgments

We should like to express our thanks to the late Dr. F. D. Howitt and to Dr. A. C. Boyle for their assistance and advice during this investigation.

HYALURONIDASE IN THE TREATMENT OF ACUTE SPRAINED ANKLE

A PRELIMINARY REPORT

By P. HUME KENDALL

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HYALURONIDASE is the specific enzyme which hydrolyses the mucopolysaccharide hyaluronic acid. This substance is widespread throughout the body, forming the principal component of intercellular ground substance and being largely responsible for maintaining the viscosity of synovial fluid. Isolated by Ragan and De Lamater in 1942, hyaluronidase has been shown to have similar properties to the spreading factor of Duran-Reynals (Hobby, Dawson, and Meyer, 1941) and remains active *in vivo*. Produced commercially under the name of "hyalase", it is extracted organically from bulls' testicles. It acts directly upon hyaluronic acid, causing its depolymerization when it is experimentally introduced into the tissues. This produces two main effects:

1. By the breaking down of the ground substance, a freer flow of intercellular fluids is obtained; hence these fluids are dispersed by external pressure and muscle action over a much greater area, resulting in rapid vascular absorption.

2. Its action upon synovial fluid is to bring about a decreased viscosity. It also acts upon the ground substance of the synovial membrane. The over-all effect is a greatly accelerated dispersion of joint fluid if this is under positive pressure.

Hyalase is already in general use in subcutaneous fluid replacement therapy and as a spreading agent in local anaesthesia; it is also injected subcutaneously to disperse haematomata and is employed as a local application in chronic ulcers. Rösing (1951) has shown that it is of value for reducing joint swelling in acute rheumatoid polyarthritis. Hyalase has also been used with success in the treatment of acute haemophilic haemarthrosis. Its use in the reduction of acute and chronic intercellular effusions and extravasations is now being investigated at this hospital.

In the present report are summarized the results of treatment with hyalase of a small section of 27 cases of acute "sprained ankle". This condition, which is of everyday occurrence, often requires a protracted period of treatment with much loss of time and a great deal of discomfort. In all cases severe ligamentous tears and bone injury of any kind were excluded by clinical and radiological examination.

P. Hume Kendall

Method

In each case before treatment was started the diameter of the ankle round the malleoli was measured to serve as an indication of the subsequent reduction of swelling. An injection of 5 ml. of normal saline containing 1,000 units of hyalase was then made locally into the centre of the effusion, after which the ankle was bound with a crepe bandage and the patient instructed to walk and resume normal activities so far as possible. The ankle was examined in several cases after 2 and 4 hours, and in every case at daily intervals. No other form of treatment, either passive or active, was given. The criteria for recovery were: (1) freedom from pain; (2) absence of swelling as compared with the normal side and assessed subjectively; and (3) normal gait.

A series of 92 similar cases—67 of which were treated by other methods and 25 were given no treatment—were used as a control, the results being compared with those in the hyalase-treated cases.

Results

In many of the 27 cases treated with hyalase there was a measurable reduction in swelling of the ankle within 2 to 4 hours. In all except 3 cases the ankle had returned to almost normal dimensions within 24 hours, and was completely normal as regards both size and sensation in 48 hours. In none of the cases was there a recurrence of symptoms. In one case in which only partial reduction in size was observed at 24 hours a further injection of hyalase was given. In this case the ankle took four days to return to normal. Two cases in which there was an associated haematoma received no benefit, but it was observed in both that the blood from the haematoma was diffused over a far greater area after the injection. The average healing time for the 27 cases (including the 2 failures) was 3.1 days.

Of the control series of 92 cases, 67 were treated as follows: (1) surged faradism, effleurage, and exercises, 17 cases; (2) local injection of 2% procaine, 25 cases; and (3) immobilization in adhesive strapping, 25 cases. The other 25 cases received no treatment.

In the following table the healing times in the hyalase-treated group and in the four control groups are compared:

Treatment	No. of Cases	Average Healing Time (days)
Hyalase injection	27	3.1
Faradism, effleurage, and exercises	17	8.7
Procaine injection	25	9.0
Immobilization and strapping	25	12.3
No treatment	25	13.9

Of the 27 hyalase-treated cases relief was immediate in 24 and only partial in 1; 2 patients obtained no relief.

Hyaluronidase Treatment of Sprained Ankle

Discussion

In the small series of cases of acute sprained ankle investigated hyalase treatment appeared to produce rapid reduction in the accompanying extravasation. The presence of chronic sprains, severe ligamentous tears, and bone injury had previously been excluded. The results of this treatment were clearly much superior to those obtained in four control groups, three of which were given other forms of treatment and one received no treatment. It was noted, however, that in one of these groups given local injections of procaine the relief of pain was more rapid, although the reduction in swelling took longer. A contraindication to the use of hyalase in cases of ankle sprain would seem to be a coexistent haematoma.

The toxicity of hyalase is said to be low, 200,000 times the therapeutic dose apparently producing no ill effects. So far no side-effects have been observed in our clinical studies. The compound is extremely stable, and is marketed as a dry, easily soluble powder in an ampoule containing 1,000 units. It is comparatively inexpensive, the cost per ampoule being less than half the price of a roll of adhesive plaster.

On the basis of this investigation local injection of hyalase is tentatively put forward as a convenient method of treatment in selected cases of acute ankle sprain, particularly with reference to its use in general practice. In view of the more rapid relief of pain noted from the local injection of procaine in such cases the two forms of treatment might with advantage be combined, and this possibility is now being investigated.

Summary

1. A series of 27 cases of acute sprained ankle were treated with the local injection of hyalase. The results were compared with those in a control series of 92 similar cases, 17 of which were given surged faradism, effleurage, and exercises, 25 a local injection of 2% procaine, 25 immobilization in adhesive strapping, and 25 received no treatment.

2. A dramatic reduction in swelling was observed in the majority of the hyalase-treated cases.

3. The recovery time in the hyalase-treated group was 3.1 days, as compared with 8.7, 9.0, 12.3, and 13.9 days in the control groups.

4. Hyalase has a low toxicity and no side-effects have been observed.

Acknowledgments

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CLINICAL REPORTS

THE SOCIAL RESETTLEMENT CASE CONFERENCE

EXPERIENCE over the past decade has shown the value of the industrial case conference, the object of which is to plan industrial resettlement whenever possible before the end of medical treatment, both to avoid unnecessary delay and to secure continuity between medical and industrial rehabilitation. More recently it has seemed that there might be a similar advantage in the establishment of social resettlement clinics or case conferences to deal with the more difficult social problems involved in the resettlement of disabled persons in their homes and in the social life of the community. During the past year, through the co-operation of the Chief Medical Officer and the Chief Welfare Officer of the London County Council, a social resettlement clinic has been established in the department of physical medicine at King's College Hospital. It is conducted by a member of the medical staff assisted by the almoner, with the district health visitor and district welfare officer and the family doctor when he can find time to attend. This clinic is proving helpful to both staff and patients in dealing with social problems, as the following four cases, shown at a demonstration conference before the 1954 Annual Meeting of the British Association of Physical Medicine, serve to illustrate.

Case Reports

The Widow and Crippled Child

CASE 1.—Miss R., now aged 36, has suffered from rheumatoid arthritis since the age of 14 and is severely crippled; the disease has, however, been quiescent for some years. She lives on the ground floor of an old terrace house with her widowed mother, now aged 68. She was absolutely dependent on her mother for dressing, toilet, and feeding, and spent her days in a high chair listening to the wireless; she took no part in household duties. She had an outing only once a fortnight, when a friend pushed her in a wheel chair.

Miss R. was referred to the department of physical medicine during an inter-current illness. As is so often the case in patients with burnt-out rheumatoid arthritis, it proved possible to achieve a worthwhile measure of rehabilitation. She can now walk about 200 yards and propel herself round the district, to see her friends and do the shopping, in a self-propelled invalid tricycle. She is completely independent in all the personal activities of daily living, and has been taught to cook and run the home after the necessary structural alterations had been carried out and special appliances supplied.

COMMENT.—This case illustrates the common problem of the widow or elderly couple with a crippled son or daughter. When the parents become infirm or die the only future for these cripples is a bed in a chronic institution unless they can be identified and taught how to be

The Social Resettlement Case Conference

independent while still fairly young and adaptable. Miss R. will be able to look after herself in her own home when her mother dies, but this has come about only through a chance illness which led to integration of her medical and social problems.

The Care of Progressive Disorders

CASE 2.—Miss B., now aged 19, suffers from Friedreich's ataxia. She lives with her grandmother. After leaving school she was recommended by the disablement resettlement officer for training in dressmaking as she had relatives in the tailoring trade and it was thought that, even if unable to travel, she would be able to do some homework. The course of training was discontinued because she proved too slow; she was therefore transferred to shorthand and typewriting, but again this proved beyond her. She was then deemed unemployable and referred to the welfare officer of the local authority. About this time she was transferred from a district hospital, which she had attended for some years, to King's College Hospital with a recommendation for physiotherapy. She was brought to the social resettlement conference, where her medical, industrial, and social problems were ventilated and integrated, perhaps for the first time. She was referred to the department of psychological medicine for intelligence tests, and to the gymnasium and occupational therapy department for assessment of functional ability. At a follow-up resettlement clinic it was agreed that she was incapable of industrial employment, but that she was suitable for a day occupation centre for the physically handicapped and that everything possible should be done to make her independent of her grandmother in the personal activities of daily living. In particular, the welfare officer arranged for the construction of an indoor toilet because the patient was unable to descend a flight of steps to cross an open yard to reach the only water-closet available.

COMMENT.—This case shows above all the importance of medical guidance in the management of progressive and unstable disabilities. There are sound industrial reasons for the choice of dressmaking or typewriting for a cripple who is, or likely to become, homebound; but the prognosis in Friedreich's ataxia indicates a vocation less exacting of cerebral and locomotor function. It may well be that the combination of a progressive disorder and social circumstances will make institutional care necessary in due course; but much can be done to help this patient to continue to live in her own home, provided that continuous medical guidance and increasing help from the local health and welfare authorities are available and co-ordinated at all stages.

The Spinster Disabled in Later Life

CASE 3.—Miss C., aged 54, lives alone in a first-floor flat reached by outside stone stairs. She has no relatives. She earned her living as a clerk in a department store until she was afflicted by left-sided hemiplegia and hemianaesthesia in 1951. The almoner of the chronic sick ward to which she was admitted for social reasons arranged for her to attend King's College Hospital daily by

Clinical Reports

ambulance. It proved possible to teach her to look after herself and do most of her own housework in spite of very little recovery in the left arm and hand. At a resettlement conference it was decided to make the necessary adjustments in her flat and see if she could resume an independent life in her own home. Arrangements were made for a home help to attend for one hour daily, and for the patient to be brought by car to the occupational therapy department twice a week for instruction in pastime occupations and in order to maintain some supervision. For the past two years she has lived happily and, in spite of her handicap, prefers being alone in her own home to institutional care.

COMMENT.—It may be asked whether a patient so disabled and alone in the world would not be happier in an institution, but when the individual prefers to live in her own home it is to the economic advantage of the nation to help her to achieve this, provided that the cost of supervision and domestic help is less than that of institutional care. In view of the doubtful prognosis in this type of case the responsibility of advising the patient to try living alone is considerable and can be accepted only if adequate welfare services are available and close liaison with them can be maintained.

The Disabled Housewife

CASE 4.—Mrs. L., a widow aged 57, has suffered from rheumatoid arthritis for fifteen years. Although severely crippled, she lives alone in a ground-floor flat owned by the borough council. Considerable alterations have been made in the home to make it easier for her to continue to be independent; in particular, the bath has been replaced by a shower under which she can sit on a high stool, and the kitchen layout has been altered and special appliances provided.

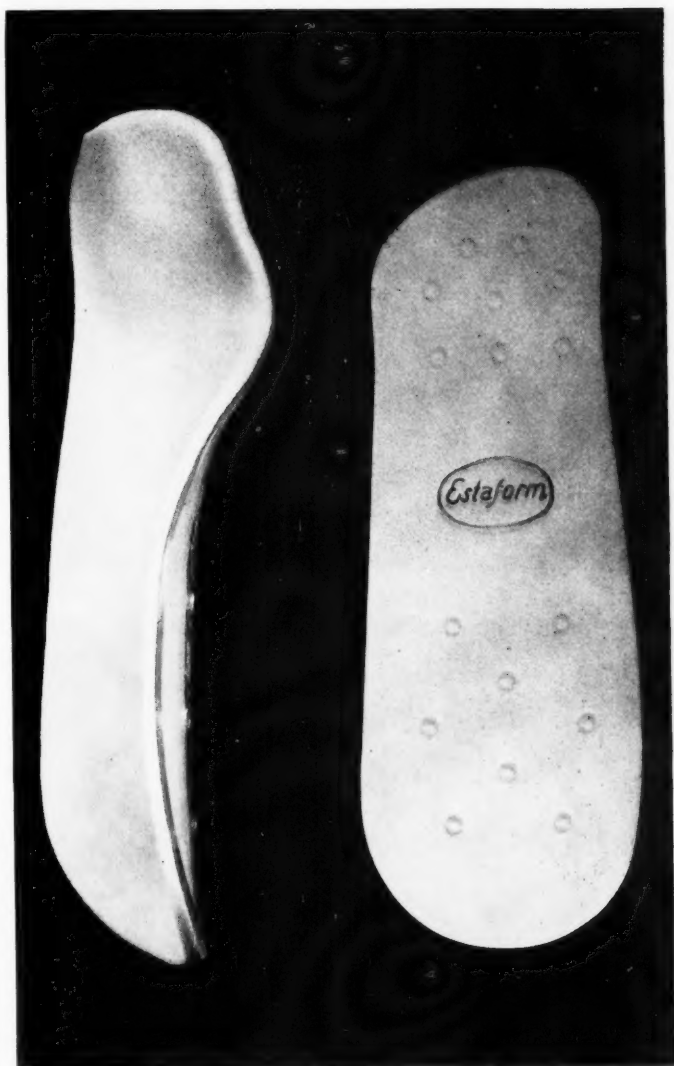
COMMENT.—In this case the borough council have been anxious to do everything possible to make life easier for their disabled tenant, but the various modifications had first to be evolved and tried out in the occupational therapy department before the local authority could be advised with confidence to pay for them and put them into effect in the home.

Conclusion

These cases are examples of the aid which can be given in the social resettlement of disabled persons through collaboration between the hospital staff seeking to restore function so far as possible and the local health and welfare authorities responsible for after-care. It may be argued that the help given to these patients is available without the need for involving busy people in a case conference; but it is only through the enthusiasm engendered and the pooling of ideas in joint consultation that many of the more difficult problems can be solved step by step.

F. S. COOKSEY

PLATE XVI



New plastic splint moulded and unmoulded.

PLATE XVII



Showing use of the splint in the correction of deformity of the hand.

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NEW APPLIANCES

NEW PLASTIC SPLINT MATERIAL DIRECTLY ADAPTABLE TO THE SKIN

It is accepted that "all acutely painful joints should be immobilized (whenever possible) by moulded splints. There must be sufficient motion to prevent ankylosis and sufficient rest to permit healing" (Comroe, 1944).

In 1852 the Dutch Dr. Mathijssen invented the plaster-of-Paris bandage. This was, and still is, the most universally accepted cast material. For more permanent use metal splints prove highly satisfactory. These have the disadvantage, however, that they must be fashioned by a skilled technician. In the last two decades numerous other materials have been tried, such as cellulose acetate and other plastics (Herschell and Scales, 1948). Although these materials have several advantages over plaster-of-Paris, either the setting or the moulding proves too inconvenient to promote widespread general use. For instance, some of the materials have to be moulded when hot—at a temperature too high to be applied to the skin. Moreover, most of them need padding to prevent pressure on bony prominences.

Our efforts have been directed towards producing a material which (1) is easy to mould to the body; (2) will set quickly; (3) has adequate strength; and (4) is light and comfortable to wear. The material now described has been found to satisfy these requirements, and in addition allows radiographs to be taken with the splint in place.

Description

The splint (Plates XVI and XVII) is composed of two firmly united layers of plastic—the outer consisting of thermoplastic supporting material and the inner of spongy insulating material. The outer layer is a transparent synthetic substance, polymethyl metacrylate, which when heated to a temperature of about 140° C. (284° F.) becomes pliable and can be moulded to the desired shape. This procedure can be repeated many times. The material is resistant to water and salt solutions, to most dilute and many concentrated acids, and to most concentrated alkali solutions. It is soluble in organic solvents such as chloroform and acetone, but insoluble in simple ethers, fats, and oils. It can be drilled or sawn and also be cemented. Its glassy surface is easily cleansed. A thickness of 1/16 inch is strong enough for arm or leg splints.

The inner layer is made of a spongy material, an isocyanate, which is resistant to the action of salt solutions, weak acids and bases; it is also resistant to petrol, ether, and oils, but not to alcohol or concentrated acids and bases. It has sufficient elasticity to follow the moulding of the splint

New Appliances

and is not modified by heating to about 160°C. (320°F.). The heat capacity as well as the heat conductivity is so low that it can easily be manipulated when hot without harming the skin. The cells of the spongy plastic are not closed as in rubberfoam; this ensures free passage of air. Thus when the splint is compressed, the air, moist with perspiration, escapes easily, and as soon as the pressure is released fresh air enters. The spongy layer absorbs water or perspiration, so that the skin remains dry even when sweating is profuse.

Applying the Splint

Heating.—A splint of the desired dimensions is heated to about 140°C. This can be done in any dry oven, but, since the acrylic resin readily absorbs rays with a wave-length of 3 to 7 μ , infra-red heating is most convenient. A suitable oven with a capacity of 1,500 watts can heat splints up to 12 \times 30 inches within six or seven minutes. (This is within the range of normal household electric installations.) Smaller splints need a relatively shorter time.

Moulding.—When heated the plastic becomes soft and malleable. The hot splint is placed directly on the limb with the spongy surface against the skin. A *tricot* bandage is promptly wrapped around the limb and splint to mould the plastic into the desired shape. A moist bandage is to be preferred, as it promotes more rapid cooling. To avoid delay in cooling only one layer of bandage should be used. If the splint is to be applied for the correction of deformity more pressure is likely to be exerted on one part of the limb than on another. The spongy layer may then become completely compressed in the pressure area so that the outer layer comes into too close contact with the skin and the insulating capacity of the inner layer is interfered with. Under these circumstances the skin should be protected by a thin bandage previously applied.

The splint sets within one or two minutes. The moist bandage is then removed and a final bandage applied. Care should be taken (1) to carry out all moulding when the splint is completely pliable, i.e. before setting starts; and (2) not to test its strength when the splint has reached 70°C. (158°F.), a critical temperature at which the plastic is very brittle. Should the moulding process not achieve the desired result the entire splint can be reheated and remoulded as often as may be required. This can also be done when an alteration in the clinical picture calls for reshaping of the splint.

When using large splints it may be necessary to make minor localized corrections. This can be done after cautiously heating the required sites with a Bunsen burner. This will, however, lead to tensions being set up inside the material, producing weaknesses in the splint, but these can be abolished by warming the whole splint to 70°C. for a period of one hour.

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PLATE XVIII



Showing adaptation of toilet seat.

[J.B.M., face p. 103]

New Plastic Splint Material Directly Adaptable to the Skin

Summary

A new plastic material for making splints is described. Its advantages are as follows:

- (1) It can be moulded on to the body in spite of the high working temperature required (140° C.).
- (2) It sets rapidly.
- (3) It can be remoulded and used as often as required.
- (4) Ventilation is provided for the skin under the splint, thus minimizing the problem of sweating.
- (5) It does not obstruct radiological examination.

REFERENCES

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HERSCHELL, W., and SCALES, J. T. (1948) *J. Bone Jt Surg.*, **30-B**, 298.

This investigation was assisted by a grant and technical support from the N.V. Esta, Voorschoten, Holland.

H. VAN SWAAY

The Hague, Holland

A SIMPLE TOILET SEAT FOR THE DISABLED

THE toilet seat illustrated in Plate XVIII has been designed to aid the disabled to be independent of the help of others. It was developed from an idea suggested by a patient at the Royal National Hospital for Rheumatic Diseases, Bath, where its use has been adopted; it has also been installed in a modified form at the Devonshire Royal Hospital, Buxton.

The appliance is simple in construction and can be made by any handyman. It consists of an additional seat fixed at a height of 4 to 6 inches above the normal seat and hinged 2 inches behind a vertical line from the lower seat hinges. Three blocks of wood of the required height are needed, one block being attached to the fixed portion of the seat and the other two to the seat itself. In addition, hand rails attached to the side walls of the toilet, or a rope suspended from the ceiling, will help a patient with weak or immobile lower limbs to regain a standing position. The metal splash ring shown in the photographs is not absolutely necessary.

J. B. MILLARD

Department of Physical Medicine,
Devonshire Royal Hospital, Buxton.

THE ELEVENTH ANNUAL MEETING

THE Eleventh Annual Meeting of the British Association of Physical Medicine was held on April 30 and May 1, 1954, in the Medical School of King's College Hospital, London. Eighty members were present.

Opening Discussion

The entire first morning was devoted to a discussion of "The Scientific Approach". Lord Horder, the President, was in the chair, and the opening speakers were Dr. A. C. Boyle, Dr. A. T. Richardson, and Dr. Richard Doll. Their papers are published elsewhere in this issue (pp. 75-89). In the subsequent discussion, to which many speakers contributed, the importance of early scientific investigation of new methods of physiotherapy was emphasized. In particular, speakers felt that such methods should be investigated before becoming popular with patients. Reference was also made to the ethical problems involved in carrying out control experiments, and the difficulties in the way of research in busy departments of physical medicine. The importance of bringing recent scientific work to the notice of physiotherapists was also commented on. In his closing remarks Lord Horder emphasized the importance of the teaching of logic in medical training, and he acclaimed the extraordinary progress that had been made in physical medicine in recent years. He felt that the agreement on the need for a scientific approach in physical medicine which had been expressed by the openers and subsequent speakers promised well for the subject.

Clinical Meeting

Following lunch in the Medical School Refectory, the afternoon was spent at a clinical meeting organized by Dr. F. S. Cooksey and his staff. The following were shown: cases of Morquio's disease and fragilitas ossium and also several cases of atypical arthritis for discussion and comment. These last included a case of manubrio-sternal arthritis of unknown origin; also a number of examples of classical rheumatoid arthritis treated with cortisone, which were used by Dr. Brewerton to illustrate the importance of "tight" intrinsic muscles of the hands in this disease. Considerable discussion centred around a case of ankylosing spondylitis with signs of aortic regurgitation, and a right-sided sciatic palsy in an eight-weeks-old baby, possibly related to nikethamide injection into the umbilical cord at birth. Mr. H. C. Edwards showed a case of osteoarthritis of the cervical spine with median-nerve pressure at the left wrist treated by decompression of the carpal tunnel. This was followed by a discussion of the causes of paraesthesia of the hand, and in particular of the incidence of compression of the median nerve in the carpal tunnel. Finally a case of infantile right hemiplegia with fits, treated by left hemispherectomy, was demonstrated.

B.A.P.M. Eleventh Annual Meeting

Annual Dinner

The Annual Dinner of the British Association of Physical Medicine was held on Friday, April 30, at Grosvenor House. Lord Horder presided, and the guests included Mr. Iain Macleod, the Minister of Health, and Mrs. Macleod, Sir Cecil and Lady Wakeley, and Sir Francis Walshe.

The Loyal Toast was proposed by the President, and this was followed by the Toast of the Association proposed by the Minister of Health, to which the President replied. Dr. A. C. Boyle proposed the health of the guests, this being replied to by Sir Cecil Wakeley.

Resettlement Clinic Cases Demonstration and Short Papers

The morning of Saturday, May 1, was taken up with a demonstration of a Resettlement Conference. This was conducted by Dr. F. S. Cooksey, assisted by Miss B. M. Abbott, physiotherapist; Miss G. MacCaul, occupational therapist; Miss A. D. Kelly, almoner; Mr. T. S. Salathiel, of the Welfare Department, London County Council; and Mr. P. Woodgate, Disablement Resettlement Officer, Ministry of Labour and National Service. During the meeting various problems in the rehabilitation of disabled persons were demonstrated and discussed. Nine cases referred for rehabilitation, all presenting medical or social problems, were shown.

In the afternoon six short papers were read. These were: "Preliminary Investigations by Plethysmography on Increasing Limb Muscle Blood Flow by the Local Constriction of Skin Vessels, using Physical Methods", by Dr. A. B. Coyer; "Pain in the Neck", by Dr. M. F. Hart; "Treatment of Low Back Pain by Manipulation under Anaesthesia; Results in 100 Cases", by Dr. A. C. Elkin; "A Clinical Trial of a Rubefacient Cream", by Dr. E. F. Mason and Dr. B. O. Scott; "Reflex Sympathetic Dystrophy", by Dr. W. St.J. Buckler; and "An Alternative Method of Treating the Hip with Short-wave Diathermy", by Dr. B. O. Scott.

At the close of the meeting the Vice-President, Dr. W. S. Tegner, expressed the thanks of the Association to the authorities of King's College Hospital for allowing them the use of the Medical School. This was coupled with the name of Dr. Cooksey, who was largely responsible for the organization of the Meeting.

A. T. RICHARDSON

BRITISH ASSOCIATION OF PHYSICAL MEDICINE

ANNUAL BUSINESS MEETING

THE business meeting of the Annual General Meeting was held on Saturday morning, May 1, 1954.

The minutes of the 1953 meeting were read and approved without dissent. Officers for 1954-5 were elected as follows:

President: The Right Hon. LORD HORDER, G.C.V.O.

Vice-President: Dr. W. S. TEGNER

Honorary Secretary: Dr. A. C. BOYLE

Honorary Treasurer: Dr. P. BAUWENS

Honorary Editor: Dr. H. A. BURT

To fill vacancies on the Council due to retirement the following were elected: Dr. DORIS M. BAKER, Dr. A. P. H. RANDLE, and Dr. G. O. STOREY.

The Honorary Editor, in presenting his report, referred to the continued problems facing the Editorial Board of the *Annals of Physical Medicine*. Although the supply of first-class papers had increased during the last year, it was still felt that more encouragement to young members to do research was necessary. Dr. Burt also referred to the increasing circulation of the *Annals*, which was a most encouraging sign, but he felt that there was still a long way to go. He concluded by expressing the thanks of the Editorial Board to Mr. H. C. Papadopoulos, who, in spite of his recent illness, continued to act as sub-editor, and who had contributed so much to the success of the journal.

Much time at the meeting was spent in discussing the Report of the Council for 1953-4 and the balance sheet presented by the Honorary Treasurer. Both referred to the need for raising the annual subscription. The Council put before the meeting a proposal that a new class of membership of the Association should be established—that of fellowship. This would involve the payment of a higher subscription. The feeling of the meeting was, however, that two classes of membership were unnecessary, and an over-all increase in subscription was recommended. It was thereupon passed unanimously that the annual subscription should be increased to four and a half guineas.

A. T. RICHARDSON

DIPLOMA IN PHYSICAL MEDICINE

THE next course for Part I of the Diploma in Physical Medicine will begin at Guy's Hospital during the first week of January, 1955. Full particulars may be obtained from the Physics Department, Guy's Hospital Medical School, London, S.E.1.

BOOK REVIEW

Shoulder Lesions. By H. F. MOSLEY, D.M., M.Ch.(Oxon), F.R.C.S., F.A.C.S.
With contributions by Francis L. McNaughton, M.S., M.D., Carlton B. Peirce, M.Sc., M.D., F.A.S.P., and Jean Bouchard, M.D., D.M.R.E.
Second Edition. Pp. 329, with 216 figures and 41 coloured plates. £4 10s.
London: Cassell & Co. 1953.

THE highly individualistic monograph on the shoulder by E. A. Codman of Boston is familiar to all, and when *Shoulder Lesions* first appeared in 1945 it was its author's intention to carry on where Codman left off. The present edition contains almost twice as much reading matter and more than three times as many illustrations as the previous edition and is in every way a more mature contribution. There are fourteen chapters, of which the first two are devoted to anatomy and examination of the shoulder, with several references to Inman's electromyographic studies of shoulder physiology. The anatomy is more than adequately covered by the superb coloured plates, not only in these chapters but throughout the volume. Their value is particularly reinforced in the next chapter on ruptures of the rotator cuff. Here the author speaks with such clarity and enthusiasm, as those who heard him deliver his Hunterian Lecture on this topic in May, 1950, will recollect, that their diagnosis seems simple. His guidance is particularly valuable as regards the difficult question of operation in the older patient, in whom this lesion is so common. The chapter on bicipital syndromes is interesting but somehow not convincing, particularly the indications for operation. Conversely, one is left in no doubt, in the chapter on calcific deposits, of the value of operation for all plaques larger than 1 cm. in diameter causing pain.

There are chapters devoted respectively to operative procedures, glenohumeral dislocations, fractures of the proximal humerus and scapula, and the clavicle and its articulations. This last chapter starts off in confusion by stating that "the clavicle is so-called because of its resemblance to the clavicle of the musical score", and then continues in a rather bewildering succession of anatomical facts and diagrams which must leave the reader uncertain as to their clinical application. The four chapters which make the book of particular value to specialists in physical medicine are "Fibrositis around the Shoulder", "The Stiff and Painful Shoulder", "Re-education of the Shoulder", and "Neurological Aspects of Shoulder Lesions", by Francis L. McNaughton. The didactic presentation of these chapters and the views expressed make them as authoritative as it is possible to be in the present state of our knowledge on these rather difficult and controversial subjects. Physiotherapy is not confined to the one chapter with that title, since detailed and often illustrated prescriptions are given throughout the book. Finally there is a valuable chapter on X-ray diagnosis and treatment by Carlton B. Peirce and Jean Bouchard; but most, including Mr. Mosley, would be rather more cautious in assessing the value of radiotherapy in the painful shoulder than are these contributors.

There is a full bibliography to each chapter, and the whole work is of such a high standard in every respect that the only real criticism, if it may be called such, is its cost, which may limit the circulation of such a valuable work.

DONALD FLETCHER

ABSTRACTS OF THE LITERATURE

The Future of Physical Medicine. Lord HORDER and B. KIERNANDER. *Med. ill.* (Lond.), 1953, 7, 851.

In this article, written for a wide audience, Physical Medicine is defined, its evolution traced, and its scope analysed. The requirements needed in a specialist in physical medicine and his training are detailed; it is pointed out that he must be a master of the art of healing.

The authors deplore the lack of research fellowships in physical medicine, and point out how necessary are controlled studies for the further development of the specialty. They consider that physical medicine must provide a complete service which bridges the gap between discharge from hospital and return to work; also that rehabilitation centres, so successful with the sick soldier or workman, must be developed for other categories such as the elderly and the chronic sick.

They end with a plea for a more hopeful and less fatalistic attitude towards the elderly sick.

D. C. ARNOTT

Investigation of the Need for Physical Treatment during Prolonged Absence from Work. C. R. LOWE and T. MCKEOWN. *Brit. J. prev. soc. Med.*, 1953, 7, 26.

An investigation into the need for physical treatment during prolonged absence from work was undertaken to provide information on the need for expansion of hospital rehabilitation services for the guidance of the Birmingham Regional Hospital Board. The authors analysed the experience of six large industrial firms with a total of 30,486 employees. The medical officers of these firms interviewed on return to work all workers who had been absent because of sickness or injury for 28 or more consecutive days. Between 5 and 10% of the employees had been away from work for at least one month during the year, and 1.4% had been in hospital; 8.7% had received some form of physical therapy, and the medical officers considered that a further 7.3% needed such treatment but had not received it; 14.5% had been admitted to a convalescent home, and it was thought that a further 17.8% might have benefited from such admission. It was considered that only 12 (2.8%) of the hospital patients might have benefited during convalescence from physical treatment (which they had not received). Of those not admitted to hospital, 103 (9%) might have recovered more quickly with physical treatment. Approximately the same proportion of employees in this group were off work for less than 12 weeks as were away for 12 weeks or more. Of those who were absent for longer than 12 weeks, there was no substantial difference between the treated and untreated groups (124 and 125 days respectively) in mean duration of absence.

On these grounds the authors conclude that, although additional facilities for physical treatment would undoubtedly contribute to the welfare of patients, the data do not suggest that they would have much effect on the mean duration of absence from work. They recommend that it would reduce the pressure on

Abstracts of the Literature

the staffs of hospital out-patient departments if general practitioners could have direct access to rehabilitation services without referring patients to a consultant, and that these services should be provided at the place of work wherever possible, so that patients could return to work while continuing treatment.

[Two important factors which should influence the need for expansion of rehabilitation services were not covered by this survey. In the first place no record has been made of the number of the more severely disabled employees who because of the nature of their disability had been forced to take up a different employment. Secondly, no detailed analysis has been made of the kind of physical therapy employed or suggested in the treatment of these patients, which may of course profoundly affect the duration of the disability. It is not yet generally recognized that at least one form of physiotherapy previously accepted has now been proved to lengthen the duration of a disability. It would appear that there is a need for a specialist trained in analysis of methods of physical treatment and rehabilitation to advise in an investigation of this nature.]

J. G. PARISH

Post-traumatic Extensor-progressive Reflex Neurological Disturbances. J. SAUCIER. *Proc. roy. Soc. Med.*, 1954, **47**, 147.

The author describes a relatively uncommon syndrome of ascending neurological disturbance which often follows a trivial wound, and, less frequently, more severe trauma involving the peripheral part of a limb. Symptoms and signs may appear at once or after a latent period, and spread gradually to involve part of the limb, the whole limb, the ipsilateral other limb, or even all four limbs. These are out of all proportion to the initial cause, and may consist of excruciating pain which over months or years slowly spreads, of twitchings, and of Jacksonian or even generalized epilepsy. Certain cases show features resembling syringomyelia or amyotrophic lateral sclerosis. The initial trauma, which is usually trivial, as a rule involves periosteum, a nerve, or a blood vessel. In most cases there are no suppuration and no reason to suspect a toxic origin.

One case history is cited as an example of a cure of widespread symptoms following removal of a glomus tumour; post-mortem details of another case are given; and a third is discussed in detail with special reference to the medico-legal aspect, which is emphasized as being important.

Complex reflex pathways are postulated to explain the spread, which may eventually involve the spinal cord, where the disturbance tends to remain ipsilateral and the spread is predominantly upwards.

RHYS DAVIES

Still's Disease Treated with A.C.T.H. and Cortisone. R. G. WELCH and C. C. FORSYTH. *Gt Ormond Str. J.*, 1953, **5**, 1.

The authors present a review of 15 cases of Still's disease treated with ACTH and cortisone at the Hospital for Sick Children, London, since these drugs were made available in 1951. In 1949 Schlesinger reported a series of 20 cases treated before the advent of hormone therapy, and in 1951 recorded his early experience with ACTH and cortisone. Six of his patients are included in this review.

At first cortisone was given intramuscularly, then by mouth in liquid form

Abstracts of the Literature

and later as tablets. The recent tendency has been to give high initial doses (up to 200 mg. daily) to overcome symptoms, and then reduce the dosage progressively. When cortisone treatment was prolonged and consequent hypofunction of the adrenals suspected, a short (7- to 10-day) course of ACTH was given terminally to encourage suprarenal recovery. ACTH was used alone in doses of 50 to 100 mg. daily by intramuscular injection and also in courses alternating with cortisone administration. A diet without added salt was given throughout treatment, and potassium chloride added in doses of 1 to 3 g. daily. Later, additional calcium salts and vitamin D were given in prolonged courses to limit osteoporosis, which was a serious complication in 2 cases. Duration of treatment varied, administration being continued for long periods when withdrawal of the drug led to relapse, with the object of controlling symptoms until a natural remission or cure occurred. Side-effects were rarer than anticipated.

Of the 15 patients 6 remain well and 3 have died. In one case the disease is well controlled by cortisone and in 2 partially so. Of the remainder, 2 are believed to be still active; one has limitation of movement but the disease is quiescent.

It is concluded that ACTH and cortisone modify the signs and symptoms of Still's disease more consistently than any other form of therapy, and that the oral administration of cortisone makes it far more tolerable to the patient without adding seriously to the risks of the disease. It is considered that the outcome to date in this series is not significantly better than that described by Colver and Schlesinger.

BASIL KIERNANDER

Cysts of the Semilunar Cartilages of the Knee Joints. J. G. BONNIN. *Brit. J. Surg.*, 1953, 40, 558.

A fresh clinical evaluation of cyst of the semilunar cartilage of the knee-joint is presented. In spite of its apparent simplicity, this condition is said to offer a number of interesting and controversial points. The cyst is described and the aetiology discussed. The author considers the lesion to be proliferative rather than degenerative. He states that the following signs and symptoms are diagnostic: pain after exercise relieved by rest but often worse at night; the presence of a cystic swelling over the joint line; and acute localization of pain and tenderness on pressure at the joint line. He concludes, on the basis of a study of 29 cases, that complete removal of the cartilage and most of the cyst seems to be an effective cure.

R. J. TALBOT

Rehabilitation of the Arthrotomised Knee. A. S. ABRAMSON. *Amer. J. phys. Med.*, 1953, 32, 93.

The object of this paper is to show that a rational system of postoperative rehabilitation will greatly reduce residual disabilities following arthrotomy of the knee-joint. The factors concerned in the stability of the knee are discussed and a rehabilitation programme is outlined.

A series of 100 patients who had undergone arthrotomy of the knee were divided into two groups of 50 of comparative age range, disabilities, and duration of preoperative symptoms. One group, used as controls, were given a simple routine consisting of quadriceps setting exercises starting on the first postopera-

Abstracts of the Literature

tive day. Bandages and sutures were removed on the 12th to 14th day. These 50 patients started partial weight-bearing at 3 weeks, and crutches were discarded at 4 to 5 weeks after operation. The other group of 50 patients were treated by immobilization in a light plaster cylinder immediately after operation for 5 to 7 days. Weight-resisted exercises were started in 2 to 5 days, and assisted knee flexion as soon as the cylinder was removed. It was found that by the time the sutures were removed at 12 to 14 days the quadriceps could usually carry 15 lb. Partial weight-bearing was introduced at 3 to 4 weeks and full weight-bearing at 4 to 5 weeks.

The power of the quadriceps was assessed in terms of progressive resistance exercises. It was found that the critical power was two-thirds the normal power, and that in the main those that reached this power had good results. Results were assessed as "good", indicating adequate return of function "at home or on the job", and "poor" where function was adequate only for sedentary occupations.

Only 27 of the control group were classified as having a good result, whereas 48 of the group treated with resistance exercises were so classified.

P. J. R. NICHOLS

Arthroplasty of the Elbow: An End-result Study. R. A. KNIGHT and I. L. VAN ZANDT. *J. Bone Jt Surg.*, 1952, **34A**, 610.

The authors have evaluated the end-results in 45 cases in which elbow arthroplasty was performed between the years 1921 and 1948.

Arthroplasty, they state, is indicated in fibrous or bony ankylosis of the elbow, and in partial ankylosis with insufficient motion or with disabling pain. Patients should be between 20 and 50 years of age. Contraindications to the operation are: (1) cases where a strong, stable extremity is needed for heavy physical labour; (2) tuberculosis; (3) osteomyelitis; (4) extra-articular ankylosis; and (5) marked muscle weakness, particularly of the biceps and forearm muscles. This last condition is usually the result of long-continued inactivity.

The authors discuss the techniques of arthroplasty used and describe the attempts at restoration of motion in the elbow and forearm. Post-operatively the limb was immobilized in a long arm cast with the elbow at a right-angle and the forearm in mid-position. An abduction humerus splint was then applied to prevent rotational stresses and strains. At the end of two weeks the splint and cast were removed, a posterior elbow splint with straps and buckles was fitted and mobilization of the joint begun. Ideally this consisted of supervised active motion, preferably against mild resistance, and gentle passive motion. The strength of the forearm muscles as well as of the elbow flexors and extensors must be developed, but at no time should passive motion exceed active motion, otherwise the joint will become unstable and the muscles lose strength. [Then why prescribe it at all?] Four weeks after operation, if strength and stability are adequate, it is recommended that the splint be discarded except at night; during the day a sling may be used as necessary.

It is estimated that the average patient will regain his motion within six months to a year after operation and his maximum degree of strength in about a year. A range of motion of from 90 to 120 degrees in a useful arc is regarded as ideal, a greater range of motion being usually accompanied by instability,

Abstracts of the Literature

increased weakness, and quick fatigue, but with little, if any, pain except after strenuous use.

Among the results in the series described, 56% were classed as good, 22% as fair, and 22% as unsatisfactory.

O. F. VON WERSSOWETZ

Colles' Fracture: A Survey of End Results. M. L. MASON. *Brit. J. Surg.*, 1953, 40, 340.

The author reviews the results of treatment in 100 unselected cases of Colles's fracture, which has been estimated to constitute one-eighth of all fractures. None was of less than one year's duration, and in each case manipulative reduction had been necessary. In rehabilitation active shoulder, elbow, and finger movements had been insisted on. The study revealed that there is an association between residual wrist pain and limitation of full range of finger movement.

The results of treatment may be summarized as follows:

In 95% of cases full function at the wrist-joint was obtained.

Clinically normal wrist and finger function with a normal cosmetic appearance and full activity resulted in 69%. In these cases no dorsal tilt or deviation of the distal end of the radius remained and the distal radio-ulnar joint appeared normal, though an ununited ulnar styloid process often persisted.

In 26% there was obvious deformity though function was good. Some displacement of the fracture was found to be very common with the application of a plaster-of-Paris splint and was considered unavoidable.

In 5% of patients there was limitation of usefulness in the limb which interfered with the carrying out of their duties. Persistent radial deviation with distal radio-ulnar joint interference was the greatest functional handicap. Complications included Sudeck's atrophy of the wrist and hand, rupture of extensor pollicis longus tendon, and the carpal tunnel syndrome.

From this study it emerges that full painless function can be regained after Colles's fracture even if the dorsal tilt at the distal end of the radius either has been uncorrected or has not been maintained in full correction.

R. J. TALBOT

Restoration of Knee Joint Function in Rheumatoid Arthritis. R. L. PRESTON. *Ann. rheum. Dis.*, 1953, 12, 290.

The author describes 18 cases of rheumatoid arthritis where extensive surgical procedures were performed in order to promote a mobile knee-joint with full extension. Full details are given of 3 of the cases. The operations varied, but often consisted of posterior capsulotomy, anterior arthrotomy with partial synovectomy, and transplantation of the tubercle of the tibia. Plaster immobilization was maintained for about a week, and then movement with traction utilized for the succeeding two or three weeks. ACTH was used pre- and post-operatively. [Details of this are, however, not given.] The results are said to be encouraging.

G. D. KERSLEY